

# GAMES PEOPLE PLAY – CREATING A FRAMEWORK FOR THE GAMIFICATION OF A MASTER’S COURSE IN A PORTUGUESE UNIVERSITY

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## Abstract

Education, like many institutions in contemporary society, faces significant challenges to the completion of its mission. This is especially true of higher education, which is often expected to be and seen as a facilitator of social and cultural advancement.

Gamification is a relatively new concept intending to use elements from video games in non-game applications. Education is therefore an area with high potential for application of this concept since it seeks to promote people’s motivation and engagement.

The research in progress aims at creating a model for applying gamification in a course of Human Resources Management for Engineers, where testing and validating the results of that application can be possible. This paper presents the state of the art of gamification in higher education, as well as some guidelines and main features of a gamification framework to be applied in the course of a Masters in Engineering.

Keywords: Gamification, Higher Education, Innovation.

## 1 GAMIFICATION IN EDUCATION

Gamification, a term that has been becoming increasingly popular since 2010 [1] [2] [3], refers to the use of game-specific strategies, dynamics and philosophies to multiple non-game contexts. In general this is used as a process to create motivation in everyday activities where there is none [4] or to “improve user experience and user engagement in non-game services and applications [5].

In general, gamification uses the potential developed by the video game technology to shape user behaviours or embed values in users [5] and some authors go as far as to say that games can make us better [6] – but all definitions seem to perspective gamification with the goal of user engagement [1].

Gamification aims at changing human behaviour by engaging people in a myriad of possible areas of business and society; although the concept has been explored primarily in the marketing area, the potential of its application has been extended to other areas such as Health, Environment, Government or Education [4]. Games have been even shown to determine the release of dopamine in users [7] and are becoming more relevant as we seem to be “moving from a time when life was all about survival to a time when it was about efficiency into a new era where design is largely about what’s pleasurable” [1]. A game is therefore “a voluntary activity structured by rules, with a defined outcome (e.g., winning/ losing) or other quantifiable feedback (e.g., points) that facilitates reliable comparisons of in-player performances” [8].

Such an impactful transversal trend involves many opportunities and risks [9].

The pervasiveness of games and gamification in society cannot be ignored by the Education sector, whose systems should be structured to prepare students effectively for life beyond school [10]. Further, play is an important element for healthy personal development (especially in children) [11], including learning development. Hence, more than being a distraction, games can be an integral part of learning and intellectual development, since they stimulate cognitive functions (e.g. imaginative play) and intended behaviors in students [12]. Generally speaking, games present a similar situation through simulation, providing us the opportunity to think, understand, prepare, and execute actions

[13] [10]. Further, games are designed to be *fun* or pleasurable which clearly increases motivation and engagement in the vast majority of students [4]

Thus, Education seems to be an area with an especially high potential for the application of gamification [4], where games can accommodate a range of learning styles within a complex decision-making context and the skills and context of many games take advantage of technology that is familiar to students to address relevant situations [10].

Application of games can encourage—or require—students to apply deeper levels of knowledge and skills, focusing their knowledge acquisition in more than simple memorization and repetition in tests, allowing them to use their new found knowledge, skills and abilities to find solutions to problems—even if simulated and fairly accessible design-generated problems. Unlike traditional assessments, which typically require students to recall or demonstrate basic levels of skills, games and simulations can present students with more authentic environments to demonstrate strategic and critical thinking which is highly compatible with the “competency model” [10]. Through games, learning can also be made more of a social and collaborative activity, which are important 21<sup>st</sup> century skills.

## **1.1 Gamification in Higher Education**

Klopfer et al. [14] defined digital-learning games as those that target the acquisition of knowledge as its own end and foster habits of mind and understanding that are generally useful or useful within an academic context. Learning Games may be associated with formal educational environments (schools and universities, online or off), places of informal learning (e.g., museums), or self-learners interested acquiring new knowledge or understanding (p. 21). As previously established, gamification is definitely an interesting topic for education, in the sense that it can increase student engagement as well as help students develop competencies in a more efficient manner, since it provides the learners with opportunities to apply and strategize previously acquired knowledge, skills and attitudes. In the European context, this approach is very much in line with the “competence obsessed” Bologna Process that has been changing the educational landscape in Europe since the beginning of the century.

Gaming is therefore seen by us as a system that allows for the acquisition and demonstration of real-world skills rather than being ‘theoretically capable’ of performing activities as requested by employers [15] as well as a way to tailor or personalize education in an efficient matter for a large scale group.

According to Baker and colleagues [16], in higher education change will occur at least in three different dimensions: 1) technologies and approaches within and beyond the classroom, 2) practices and processes that enable learners to acquire the necessary skills, and 3) institutional change and innovation that make these disruptions possible.

In this paper we will address the first 2 issues pointed out by Baker et al [16], in the hope that success in this endeavour will also promote the third aspect of institutional change and innovation. Successful games typically include three aspects: a goal that is to be met by the learner, obstacles that create challenge and difficulty for the learner, and collaboration or competition, which can include competition against own self [16].

## **2 CREATING A GAMIFIED COURSE IN HUMAN RESOURCES MANAGEMENT FOR ENGINEERING STUDENTS**

### **2.1 Contextual Background**

The specific course we are addressing is Human Resources Management (HRM) and it is part of the Integrated Masters in Industrial Engineering and Management (MIEIG). This subject seems to be somewhat estranged to the students who find the ambiguities, paradoxes and lack of definitive answers in HRM frustrating, discouraging and generally a sign of poor quality of work in the field. After 4 years of training in engineering, students resist the “soft skills” approach needed to understand the subtleties of HRM, although they are very much motivated to learning how to work with and lead people.

This leaves us in an interesting conundrum: students in this masters are the best in their faculty, used to excelling in their work and they are aware that they need to collaborate and develop more “people skills”, but they are unable to forgo of their usual problem-solving frameworks to address more human and ambiguous issues that might not have definite answers and – even worse – cannot be empirically proven as generally good, because they do vary a lot on a case to case basis.

In previous years this has led to the slow disengagement of students throughout the semester: as students realize they are either not being able to solve the problems offered by the course or they think “any answer will do” (one of the big problems with uncertainty and ambiguity is that many answers can be acceptable, provided the right context and justification).

However, previous experiences with educational games seem to captivate and motivate these students: small games and group dynamics have been widely accepted and increased the levels of class participation and student engagement in the past.

Due to the contextual difficulties presented here, this course has been eliminated from the study plan of this Masters and will be taught for the last time this year.

Regardless, the lecturing team decided to try an innovative method for the final year of the course.

## **2.2 Design Process**

Dickey [17] proposes three main elements of engaged learning: increasing challenge, reinforcing feedback and clear goals and tasks. Other features of successful games are limited negative consequences for risk-taking and opportunities to apply choice. Fladen and Blashki [18] list interactivity, agency and engagement as the three features of motivating games, whereas Rigby and Ryan's [19] perspective is that Player Experience of Need Satisfaction (PENS) is the drive that makes games so engaging, by allowing subjects to address their needs for competence, autonomy, and relatedness. Juul [20] defined games as having six features: (a) a rule-based formal system, (b) variable and quantifiable outcomes, (c) different assigned values for different outcomes, (d) an outcome influenced by the efforts that the player exerts, (e) players feeling emotionally attached to the outcome, and (f) consequences of the activity that are negotiable.

We designed the gamification scheme for the Course of HRM with a few of these basic principles in mind.

### **2.2.1 Games should be challenging but achievable**

“The key is to set the level of difficulty at the point where the learner needs to stretch a bit and can accomplish the task with moderate support” [21]

According to McClarty and colleagues [10], well designed games and well designed education share the common characteristics of being challenging but achievable. Thus, challenges should be designed according to different participant skill level in order to maximize engagement [22], which is in line with educational theories such as Vygotsky's [23] theory of proximal development: the distance between the current and next level of achievement in development, overcome by problem solving with adult supervision or peer cooperation. Games aim at providing opportunities for appropriate guidance or collaboration in order to help players meet the next level of challenge in a sustained incremental fashion that allows for developing game skills as well as strategies for coping with progressing challenges [10].

### **2.2.2 Educational games should provide good feedback**

Effective games provide feedback that is “(1) clear and unobtrusive, and (2) immediately responsive to the player's actions” ([19], p. 8). Thus, feedback (qualitative and quantitative in preference) should be available to students in as a contingential and positive fashion as possible as to reinforce motivation [4]. Students should be able to adapt to the feedback, but the game should also be able to adapt to the student.

### **2.2.3 Debriefing is critical in Education**

According to Lederman and Fumitoshi [24], debriefing is critical in education, allowing students to connect the game skills to their real-world context, as well as to promote further higher order realizations that allow for processes leading to metacognition – which means that students should furthermore be encouraged to share different ways of approaching a given challenge or problem. Evidence suggests that games work best when coupled with effective pedagogy [25] and that skills developed in computer or video games need support in order to be transferred to other contexts [12].

#### 2.2.4 *KISS - Keep It Simple, Silly*

The game should be simple enough to understand at a glance or to feel intuitive. Tasks and goals must be clear, broken in as simple as tasks can be and they adapted to student skill level, evolving with the students as much as possible [4].

The sequence of the game tasks is as much as possible decided by each student, therefore promoting some sense of autonomy and allowing for students to feel they can choose and somewhat customise the game.

#### 2.2.5 *Social Recognition*

The game must allow for students to be recognized and rewarded by teachers and their peers, feeding their social status to a certain extent, although ideally, motivation for the game should be internal and non dependent of extrinsic rewards.

Further, the game aims at allowing students to explore different parts of their personality and different social roles, allowing students to safely experience different sides of themselves while reinforcing their school-based identity [4].

#### 2.2.6 *Adaptability to students' likes and styles*

As much as possible games should be adapted to players. Thus and since the game we are developing deals at its heart with social sciences contents we would like to further the issues of identity exploration by allowing students to be able to select the activities they mostly identify with or find interesting in the game, therefore creating some room for choice. This notion aims at encouraging students to experiment by allowing freedom to fail in the classroom and course [26], "encouraging learners to explore content, take chances with their decision making, and be exposed to realistic consequences for making a wrong or poor decision" [26]. The support to this healthy freedom to choose and fail is provided by rapid cycles of feedback [26] (this is also point 2.2.2 of our basic principles). This perspective allows failure to serve as an integral part of the learning experience [12] [14] encouraging players to improve through repeated practice either by advancing within a game or replaying parts of a game and preparing students for "real-world experiences" where often turning failure around makes a bigger difference for success than getting a right first time.

### 2.3 **Game Characteristics**

Scott and Neustaeder [28] bring our attention to the fact that simply modifying the pedagogical lingo to games lingo (e.g. renaming the performance of presentations as 'completing quests', taking tests as 'fighting monsters', writing papers as 'crafting', and receiving letter grades as 'gaining experience points') is not enough to gamify the classroom. When implemented properly, gamification can help enrich educational experiences in a way that students will be familiarized with and able to respond to [28].

Our take on gamification began with the type of behaviours and attitudes we want students to develop. Since this course has a very small amount of credits, compared to others, we chose five major objectives:

1. Acquiring comprehension of the basic HRM system;
2. Developing interpersonal competencies;
3. Developing an openness to ambiguity, uncertainty and human complexity (lack of yes/no, right/wrong answers)<sup>1</sup>;
4. Developing a scientific curiosity towards HRM;
5. Promoting the interest on general HRM/People Management and critical thinking on different realities within HRM.

Bearing in mind our KISS principle, we thought of different ways to operationalize our objectives, and paired them with a game activity, as such:

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<sup>1</sup> This is especially important in engineering students, where the culture is mostly focused on "how to"'s and exact solutions that are more or less easily generalizable.

Objective	Operationalization	Game Activity
1	Presenting integrated knowledge on HRM systems	Presenting integrated HRM systems case studies
2	Team work, team quests, interviewing others	Group work, role-plays, organizing events
3	Searching for multiple answers to the same problem and contextualizing its success or failure	Benchmarking exercises, case studies, role-plays
4	Research and presentation of interesting papers in HRM	Presenting a paper (orally or via poster) to the class; organizing a journal club type of event
5	Going to and participating in seminars/conferences on HRM	Posing questions to seminar guests in HRM classes, attending seminars and reporting on them

Game activities are scored beyond the 2000 points that correspond to the maximum grade (20 values) in the Portuguese Higher Education system, so that students may select their activity plan according to their style and interests. Points are calculated considering the workload involved in each task, but they are distributed throughout our objectives so that students must select activities encompassing at least 4 out of the 5 objectives.

Surprise quests will be included in the games as to reward students that are more engaged and permit students that are behind to catch up somehow.

One of our unresolved issues is the visual appeal of the game since a) there is no budget for this project and b) neither lecturer has a background in design or is familiar with programming, which means that the online feedback platform might be less appealing than ideally in order to have an impact in furthering participant interest and interactivity. This is a flaw that might be suppressed either integrating another person in the team, or by creating some compensatory feedback mechanism.

With this in mind, Iosup and Epema's [28] tools for gamification structure the way the course is taught, namely the 3 core mechanisms (point system; levels, access and power and leader boards) and the 4 core dynamics (badges and other status displays; on boarding; social engagement and design loops; unlocking content).

## 2.4 The role of the professor

With this approach, we believe the roles of the lecturing team will be profoundly altered and we expect students to take centre-stage in their learning process, acting more as facilitators and mentors. We believe this will increase their autonomy and will change the pedagogical relationship to a more personalized one where the teacher is not expected to parrot the same lecture every time but can actually collaborate with students in projects or guide students in their assignments.

We believe this approach and this type of teacher role as a mentor and social facilitator to be more in tune with what is expected of contemporary higher education and more suited to create competencies in HRM and interpersonal interactions that are transferrable to the workplace.

## 3 CONCLUSIONS

Gamifying the HRM course in an Engineering Master Course is an approach we believe will be able to create more student engagement and participation, allowing students to overcome negative stereotypes they associate with social sciences in general since they are less "exact" and less "predictable" than the type of contents and subjects students are more used to dealing with.

We believe we have developed a thoughtful approach that is not merely applying points and badges to a course, but that actually might incentivise and help students develop competencies that are crucial to their professional future.

In future research it is important to explore the connection between this type of gamification and student learning and performance, an area where research is still lacking [10].

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